WHAT IS CLAIMED IS:

SUB A5

1. A soft-start system for electrical power systems comprising:

a capacitor connected to a first bus of a DC link;

a resistor connected a second bus of the DC link, wherein the resistor and capacitor are connected in series;

a switching device connected in parallel with the resistor; and

a triggering circuit for measuring a DC voltage on the DC link and activating the switching device to short circuit the resistor.

2. The soft-start system of claim 1, further comprising:

a rectifier that receives AC power from a source and converts the AC power into DC power in the DC link.

3. The soft-start system of claim 1, wherein the switching device is an Insulated Gate Bipolar Transistor (IGBT).

4. The soft-start system of claim 1, wherein the switching device is at least one of an electromechanical, device, solid-state device, a Bipolar Junction Transistor (BJT), Field Effect Transformer (FET), Metal Oxide Semiconductor FET (MOSFET), Silicon Controlled Rectifier (SCR), switching diode, and hybrid device.

5. The soft-start system of claim 1, wherein the capacitor is a capacitor bank.

6. The soft-start system of claim 1, wherein the switching device is co-packaged into the rectifier.

7. The soft-start system of claim 6, wherein rectifier is formed of six IGBTs and wherein the switching device is a seventh IGBT.

8. The soft-start system of claim 7, wherein the IGBTs of the rectifier are co-packaged in a single package.

A5 Cont

9. The soft-start system of claim 7, wherein the IGBTs of the rectifier and the switching device are co-packaged in an Intelligent Power Module (IPM).

10. The soft-start system of claim 1, wherein the resistor is a resistor bank.

11. The soft-start system of claim 1, wherein the first DC bus and second DC bus are coupled to an inverter.

12. The soft-start system of claim 1, wherein the triggering circuit is powered from the DC link.

13. A method for soft-starting a DC link in an electrical power system, the method comprising:

charging a capacitor connected to a first bus of the DC link, wherein a resistor is connected to a second bus of the DC link, and wherein the resistor and capacitor are connected in series;

measuring the charge of the capacitor; and

activating a switching device, wherein the switching device is connected in parallel with the resistor, and wherein the switching device when activated short circuits the resistor.

14. The method of claim 13, wherein the charge on the capacitor is determined by hysteresis control.

15. The method of claim 13, wherein the charge on the capacitor is measured by measuring at least one of voltage across the resistor, current through the resistor, a voltage between the first and second bus and voltage across the capacitor.

16. The method of claim 13, wherein the switching device an Insulated Gate Bipolar Transistor (IGBT).

17. The method of claim 13, wherein the switching device is at least one of a Bipolar Junction Transistor (BJT), a Field Effect Transistor

As Cont

(FET), a Metal Oxide Semiconductor FET (MOSFET), a Silicon Controlled Rectifier (SCR), a switching diode, and a hybrid device.

18. The method of claim 13, wherein the switching device is integrated into a rectifier that converts AC power to DC power and supplies the DC power to the DC link.

19. The method of claim 18, wherein rectifier is formed of six IGBTs and wherein the switching device is a seventh IGBT, and wherein the IGBTs of the rectifier and the switching device are contained in an Intelligent Power Module (IPM).

20. The method of claim 13, wherein a triggering circuit measures the DC voltage on the DC link and activates the switching device to short circuit the resistor, and wherein the triggering circuit is powered from the DC link.